

Physical Metallurgy and Pressworking of Metals

SOV/5690

Problems of automatic inspection and control of multidraft wire-drawing frames are also considered. Most of the papers are accompanied by references, the majority of which are Soviet.

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AVAILABLE: Library of Congress

Card 6/6

VK/vrc/mas
11-22-61

S/137/62/000/004/099/201
A052/A101

AUTHOR: Kirillov, P. G.

TITLE: On the problem of the mechanism of deformation of metallic bodies

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 28, abstract 4I160
("Tr. In-ta yadern. fiz. AN KazSSR", no. 4, 1961, 3-8)

TEXT: The mechanism of deformation of a metallic body is considered as a gradual disruption of bonds between the particles of the deformed body with their possible, under certain conditions, subsequent recovery. The strengthening is a gradual raising of the resistance to stress in the process of deformation. There are 18 references.

M. Matveyeva

[Abstracter's note: Complete translation]

Card 1/1

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2808

26390
S/032/61/027/008/015/020
B103/B203

AUTHORS: Kovrev, G. S., and Kirillov, P. G.

TITLE: Method of determining the strength properties of metals at high temperatures

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 8, 1961, 1018 - 1021

TEXT: The authors developed methods of testing the elongation of metal specimens (tungsten) at high temperatures and deformation rates. When the deformation was accelerated from 555 to 3500 %/sec, the plastic strain of tungsten specimens was found to remain constant for the same temperature and degree of deformation. Besides, the plastic strain of specimens heated to 1500°C was shown to rise by 25 - 30 % at a rate of 3500 %/sec, as compared with 555 %/sec. The effect of the deformation rate on the deformation resistance is not yet known for many alloys and metals, including tungsten. Tungsten differs from most metals and alloys by its friability. Its initial structure, grains with equally long axes, changes in deformation since the grains are lengthened. The resulting texture leads to higher plasticity and strength. This texture disappears, however, on heating

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above recrystallization temperature, and the metal becomes friable again. The authors describe their quick tensile tests of tungsten specimens (also applicable to other metals) at over 1000°C. Such tests are rendered difficult by the necessity of holders resisting such temperatures. If the holders are to be kept distant from the heating zone, long specimens would be required. Water-cooled holders create a high temperature gradient along the specimen. In the authors' methods, the maximum test temperature is not limited by the resistance of holders but by the furnace construction. The protective gas produced by heating prevents oxidation of specimens. Tests were made on a chain draw bench with four slide speeds to simulate real conditions as closely as possible (deformation rate of tungsten in rolling is 500 - 1500 %/sec). The authors used 0.222 and 1.4 m/sec. At a calculated specimen length of 40 mm, this corresponds to deformation rates of 555 and 3500 %/sec. Specimens were produced from rods by rotary forging at 1400 - 1100°C, and contained 0.001 % Ni; 0.01 % SiO₂; 0.005 % CaO and 0.029% Mo; the rest was W. The holders were made of hardened Y7(U7) steel. Fig. 2 shows a diagram of the apparatus. The specimen 1 in a quartz tube 2 was heated in an electric circular furnace 3 with a silicon carbide

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heating. The projection 4 prevented the specimen from gliding in the tube. The platinum - platinum - rhodium thermocouple 5 indicated the specimen temperature. After reaching the temperature required, the quartz tube in the furnace was turned through 180°, and the specimen dropped from the tube through the funnel 6 into holder 7. The slide 8 was quickly coupled to the moving chain 9, and the specimen was ruptured. The specimen temperature was recorded during its stay in the holders on an oscilloscope by means of the optical head 10 (consisting of focusing lens and photoresistor with small time constant). The optical head was calibrated before the test, and a calibration diagram plotted in the coordinates "deviation of the ray in mm - temperature in °C". The sine curve of the a-c voltage of a 3P.10(2G-10) sound generator was simultaneously recorded on the chart. The stress was recorded by the measuring box 11 fed from an ЭТ-4(ET-4) four-channel amplifier. The measuring box was calibrated on the bench by means of a spring dynamometer with pointer. The oscillograms were evaluated as follows: 1) The point corresponding to the beginning plastic deformation was determined on the oscillograms considering the known slide speed and the sine curve recorded (see above). 2) The specimen diameter was measured after rupture in the area of steady necking. The specimen volume was divided by the area corresponding to the diameter measured. Thus, the

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authors determined the length of the calculated part at the moment of maximum uniform deformation. 3) From the beginning of plastic deformation, the authors calculated, from the number of periods, the time during which the absolute elongation of the specimen proceeded which corresponded to maximum uniform deformation of the specimen. The stresses in this section were calculated by dividing the load at the given instant by the area of the specimen cross section at the same instant (this area was determined from the condition of constancy of the specimen volume during deformation). 4) In the section corresponding to localized deformation, the cross-sectional area was determined graphically. The authors explain their results, mentioned at the beginning, as follows: At 1200°C and 1350°C, no effect of the deformation rate on the plastic strain was found. At these temperatures, the rate of recrystallization of specimens with the corresponding content of admixtures is much lower than the deformation rate. Therefore, the strength is not changed by recrystallization on transition from one rate to another. At 1500°C, however, recrystallization becomes much more intensive. Since recrystallization reduces the plastic strain, the character of the curve depends on the interrelation between the deformation rate creating a strength-increasing tungsten texture and the recrystallization rate at

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which the deformation texture is more or less replaced by equiaxial grains, which also reduces the mentioned stresses themselves. This is confirmed by an increase in relative elongation and relative transverse contraction of specimens deformed at 1500°C at a rate of 3500 \times /sec. There are 5 figures and 7 references: 4 Soviet-bloc and 3 non-Soviet-bloc. The three references to English-language publications read as follows: P. K. Cook, Proc. conference on the properties of materials, Session 3, paper 2, London, May (1957); A. Nadai, M. Manjon. High-speed tension tests at elevated Temperatures, Parts I,II -Proceed. ASTM, v. 40 (1941); B. L. Mordike, The J. of the Inst. of Metals, v. 88, No. 6, p 272 -275 (1960).

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im. M. I. Kalinina
(Krasnoyarsk Institute of Nonferrous Metals imeni M. I. Kalinin)

Card 5/6

S/137/62/000/006/105/163
A052/A101

AUTHORS: Kirillov, P. G., Zlotin, L. B.

TITLE: The dependence of the resistance to deformation on the character of the change of rate in the process of high-rate deformation

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 6, 1962, 33 - 34, abstract 6I198 ("Sb. nauchn. tr. In-t tsvetn. met. im. M. I. Kalinina", no. 33, 1960, 305 - 309)

TEXT: The effect of the change of the linear rate of deformation on the resistance to deformation was investigated when stretching Cu of M1 (M1) grade and Ni of H1 (N1) grade and also when upsetting Pb. The tests were carried out on annealed cylindrical samples 5 mm in diameter and 50 mm long. The Cu and Ni samples were deformed on a vertical ram impact machine under tensile conditions. The weight of the drop load was 20 and 280 kg. It has been established that at a linear rate of deformation decreasing considerably in the process of tension the resistance of metals to deformation increases noticeably. A similar dependence of the resistance to deformation on the character of change of the linear

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The dependence of the...

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A052/A101

rate of deformation was obtained when upsetting on a vertical impact machine pressed-rod Pb-samples 8 mm in diameter and 13 mm high. At the beginning of the process of deformation the resistance to deformation of Pb at a higher initial linear rate of deformation has a lower value than at a lower initial linear rate of deformation. The conclusion is drawn that the character of the change of the linear rate of deformation in the process of deformation has an essential effect on the resistance of metals to deformation; the closer the curve of the change of the linear rate of deformation approaches the constant linear rate of deformation, the lower the resistance to deformation.

L. Gordiyenko

[Abstracter's note: Complete translation]

Card 2/2

8/123/62/000/023/001/008
A004/A101

AUTHOR: Kirillov, P. G.

TITLE: Problems of the dependence of the resistance to deformation on the deformation rate

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 23, 1962, 11, abstract 23A70 ("Sb. nauchn. tr. In-t tsvetn. met. im. M. I. Kalinina", 1960, v. 33, 339 - 348)

TEXT: The author investigated the dependence of the resistance to deformation on the deformation rate during tension of Cu, Zn, Ni, Pb, the brass grades L62, L68, L70, LT90, LT96, cupronickel, German silver, low-carbon steel, and the Al-alloys Д1 (D1) and Д16 (D16). The deformation rate was varied from 10^{-3} to $2 \cdot 10^2 \text{ sec}^{-1}$, the temperature range from 20°C to the temperature of hot deformation. A new method of measuring the deforming stresses is recommended, based on the principle of direct loads with controlled rate of load displacement. Force graphs of deformation are presented, obtained on a machine developed by the author and on the P-5 (R-5) machine. The results obtained confirm the

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opinion that the primary tension curve at the end of the process should descend to the axis of deformation. The phenomenon of a reduction of the true stress while the relative reduction in area increases (at high temperatures and a low deformation rate) was experimentally established. The microanalysis showed that microcracks are originating in the tested specimens along the grain boundaries, sometimes reaching up to the surface. Simultaneously a growth of the grains was registered. All this gives every reason to assume that the causes of a reduction of the resistance to deformation at a decrease in the deformation rate are not only the weakening processes, but also other ones, in particular processes of intercrystalline corrosion and a considerable growth of grains. The possibility of a destruction of the entirety of the specimen under certain tension conditions also indicates that the true cross section area of the specimen cannot always be determined from its outside diameter. This explains the extraordinary shape of the curve of true stresses. Under certain conditions, the elongation grows with an increase in the deformation rate. The curve of tensile strength variation of Cu at 600°C when the deformation rate varied from 10^{-3} to 10^2 sec^{-1} shows that the intensity of changes in tensile strength is lower at high deformation rates than at low ones; this contradicts the conclusions of

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several authors. Consequently, in the range of elevated deformation rates that are used in practice, an increase in the deformation rate insignificantly raises the deformation resistance. The yield point practically does not increase with an increase in the deformation rate at 20°C. There are 9 references.

B. Kopylskiy

[Abstracter's note: Complete translation]

Card 3/3

GLEBOV, Yu.P.; KIRILLOV, P.G.

Device to study the nonuniformity of metal flow during rolling.
Sbor. nauch. trud. GINTSVETMET no.33:349-354 '60. (MIRA 15:3)
(Rolling (Metalwork))

S/124/63/000/001/064/080
D234/D308

AUTHOR: Kirillov, P.G.
TITLE: Problems of the dependence of resistance to deformation on the velocity of deformation
PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 1, 1963, 71, abstract LV566 (Sb. nauchn. tr. In-t tsvetn. met. im. M.I. Kalinina, 1960, v. 53, 339-348)

TEXT: For a large number of metals it is stated that, at 20°C and with an increase of deformation velocity from 1/1000 to 200 sec⁻¹ the resistance of deformation increases little, the yield limit does not increase practically. Several affirmations refer to tests at high temperatures. To confirm the conclusions, only isolated typical examples are given, often without indication of the material. Quantitative data in the form of two graphs are given only for copper. (Abstracter's note: If the modulus of elasticity is estimated according to the initial section of the elongation curves given by the author (where incidentally, the deformation velocity is indicated

Card 1/2

KIRILLOV, P.G.

Forming, deformations and forces. Trudy Inst. met. i obog. AN
Kazakh. SSR 7:138-143 '63.

Kinetics of the forming process. Ibid. 144-160 (MIRA 17:6)

KIRILLOV, Petr Georgiyevich; URUSOV, K.G., dots., kand. tekhn.
nauk, retsenzent; IVANOV, I.I., dots., kand. tekhn. nauk,
retsenzent; OVSYANNIKOVA, Z.G., red.

[Theory of metalworking by pressure] Teoriia obrabotki metal-
lov davleniem. Moskva, Vysshiaia shkola, 1965. 295 p.

(MIRA 18:10)

1. Vsesoyuznyy zaochnyy politekhnicheskii institut (for Urusov).

ACC NR: AM6004097 (A)

Monograph

UR/

Kirillov, Petr Georgiyevich

Theory of metalworking by pressure (Teoriya obrabotki metallov davleniyem) Moscow, Izd-vo "Vysshaya shkola", 1965. 295 p. illus., biblio. 9000 copies printed.

TOPIC TAGS: metalworking, ^{metal} deformation, ^{pressure effect, metal rolling, metal forging,} ~~pressure, deformation, physical properties,~~ ^{metal} plasticity, material failure, metal stress, metal drawing, ^{mechanical stress,} ~~mechanical properties~~

PURPOSE AND COVERAGE: This textbook is intended for students of schools of higher education specializing in metallurgy. The book deals with processes of pressure metalworking. Deformation of metal, the mechanism of deformation, different types of deformation, metal plasticity, metal failures, metal rolling, upsetting, extension, forging, drawing are discussed at length along with the physical principles, of deformation and stresses caused in metal by nonuniform deformation. Numerous calculations are given and various diagrams are presented. The author thanks K. G. Urysov, Docent, Candidate of Technical Sciences, I. I. Ivanov, Docent, Candidate of technical sciences, and Yu. P. Olebov, Candidate of technical sciences for their assistance.

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ACC NR: AP6034227

(N)

SOURCE CODE: UR/0120/66/000/005/0110/0114

AUTHOR: Nazarov, V. B.; Zabrodin, V. A.; Kirillov, P. K.; Gal'perin, L. M.

ORG: Affiliate of the Institute of Chemical Physics, AN SSSR, Chernogolovka (Filial Instituta khimicheskoy fiziki AN SSSR)

TITLE: Reversible digital to analog converter counter based on decatrons

SOURCE: Priory i tekhnika eksperimenta, no. 5, 1966, 110-114 .

TOPIC TAGS: pulse counter, digital analog converter

ABSTRACT: Figure 1 shows a simplified diagram of the digital to analog converter, associated with an up-down counter utilizing decatrons as counting elements. Such a counter is frequently needed in automatic control applications, where it is necessary to obtain a voltage proportional to the accumulated number of pulses. While the actual counter circuitry is conventional for use with decade counting and glow transfer tubes, the method of digital to analog conversion is quite unusual. As shown in figure 1, each decade is equipped with a bank of resistors. One resistor is associated with each cathode (except "0") in each of the three decatrons. The resistor values are weighted to generate output voltage exactly proportional to the instantaneous accumulated pulse count stored in the decatrons. Constant current sources are used to supply each of the tubes. The design of the current sources is conventional, utilizing a series triode in

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UDC: 621.374.324

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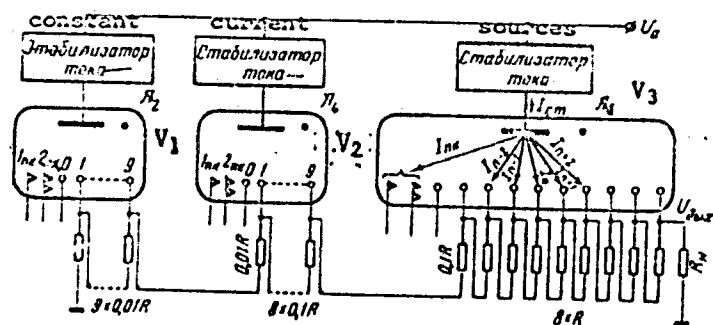


Fig. 1.

which the grid bias is maintained constant by a transistor network with a voltage reference in the form of a glow tube. The expressions for the output voltage and the predictable errors are given as functions of the pulse count and the circuit parameters. The total conversion error does not exceed 0.1% for temperature fluctuation of $\pm 5^\circ\text{C}$ and line voltage changes of $\pm 10\%$. Transistor logic is utilized in the input signal and the steering control. The instrument can be used for generation of extremely long ramp voltages. In this case the input pulses are generated by a crystal controlled oscillator. Orig. art. has: 4 figures, 5 formulas.

SUB CODE: 09/

SUBM DATE: 27Aug65/

ORIG REF: 003/

OTH REF: 001

Card 2/2

KIRILLOV P.K.
KIRILLOV, P.; LITVAK, I.

Radio relay from airplanes. Radio no.11:38-39 H '57. (MIRA 10:10)
(Radio relay systems)

112-57-8-17755

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1957, Nr 8,
pp 270-271 (USSR)

AUTHOR: Kirillov, P. K.

TITLE: Reception of the Moscow Television Center Beyond the Direct-
Visibility Range (Priyem MTTs za predelami pryamoy vidimosti)

PERIODICAL: Tr. Televiz. fil.-labor. M-vo radiotekhn. prom-sti SSSR,
(Transactions of the Television Branch Laboratory. Ministry of the
Radio-Engineering Industry, USSR), 1956, Nr 1, pp 48-63

ABSTRACT: Continuous variations of signal level, which are determined by distance, by various states of the atmosphere, and by nonuniform attenuation in the transmission channel for various frequencies, are peculiar features of a long-distance reception beyond the direct-visibility range. High-gain antenna systems, such as Yagi and rhomb, have been tested. Keeping internal noise in mind, the maximum sensitivity of the receiver has been selected at 25 μ v. For a better noise resistance a separate sync channel and AGC at IF with a 0.4-mc band have been used. The outfit is recommended for studies of TV signal transmission over

Card 1/2

KIRILLOV, P.L.; TROYANDV, M.F.

Mistake in heat capacity values for sodium-potassium alloys.
Atom. energ. 5 no. 4:491 0 '58. (MIRA 11:12)
(Sodium-potassium alloys--Thermal properties)

87657

S/137/60/000/010/002/040
A006/A001

11.3950

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No. 10, p. 5, # 22408

AUTHORS: Kirillov, P.I., Subbotin, V.I., Suvorov, M.Ya., Troyanov, M.P.

TITLE: Investigation of Heat Transfer in a Tube to a Sodium-Potassium Alloy

PERIODICAL: V sb.: Vopr. teploobmena, Moscow, AN SSSR, 1959, pp. 80 - 95

TEXT: The authors studied heat transfer in a round Cu-tube to an eutectic 22% Na-78% K alloy. It was established that the value of the coefficient of heat transfer from the wall to the liquid metal increased with time and attained a stable value within about 800 hours of operation; this value is in a satisfactory agreement with the Martinella - Lyon (Martinella-Layon) theoretical formula $Nu = 7 + 0.0025 Pe^{0.8}$.

A.N.

Translator's note: This is the full translation of the original Russian abstract.

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SOV/170-59-5-1/18

AUTHORS: Kirillov, P.L., Grachev, N.S.

TITLE: Determination of Sodium Vapor Pressure at Temperatures From 880 to 1,300°C (Opredeleniye uprugosti parov natriya pri temperaturakh 880 - 1,300°C)

PERIODICAL: Inzhenerno-fizicheskii zhurnal, 1959, Nr 5, pp 3-7 (USSR)

ABSTRACT: It is necessary to know the pressure of sodium vapors at high temperatures from 900 to 1,300°C, when sodium is used as a heat carrier in this range of temperatures. The previous investigations of Ditchburn and Gilmour [Ref 1] and Makansi et al. [Ref 2] led to the temperature (T) - pressure p_g - relation of the following type:

$$\lg p_g = - \frac{A}{T} + C$$

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This expression, however, cannot be quite satisfactory, because it is assumed that evaporation heat does not depend on temperature.

SOV/170-59-5-1/18

Determination of Sodium Vapor Pressure at Temperatures From 880 to 1,300°C

If this dependence is taken into consideration, then the character of the relation would take the following form:

$$\lg p_s = - \frac{A}{T} + B \lg T + C$$

The authors carried out 3 series of experiments to check this theoretical relation. The temperature range was from 880 to 1,300°C. As a result, 44 experimental readings were obtained, and the values of the pressure of saturated sodium vapor were plotted versus temperature values on Graph 2. The curve obtained can be satisfactorily represented by the following analytical expression:

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$$\lg p_s = - \frac{5589}{T} - 0.5 \lg T + 6.270$$

5(2)

SOV/89-6-3-12/29

AUTHORS: Grachev, N. S., Kirillov, P. L.

TITLE: An Apparatus for Removing Oxygen and Water Vapor ^{Traces} From Inert Gases (Ustanovka dlya tonkoy ochistki inertnykh gazov ot kislороda i parov vody)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 3, pp 327-329 (USSR)

ABSTRACT: The apparatus used - it is schematically represented in figure 1 - consists of a cylindrical container (diameter 105 mm, length 2500 mm, made of 1Kh18N9T steel) containing 10 kg of coppered silica gel. In a container the dimensions of which accurately correspond to those of the cylindrical container, the supply pipe is led down to the bottom of the container. This container is filled with 5 - 7 l of sodium or with a mixture of sodium - potassium. In order to increase its efficiency bundles of steel cuttings are inserted into the absorber. A buffer volume prevents contamination of the coppered silica gel by metal. At the outlet of the container a filter is applied absorbing the sodium vapors. The purified inert gas is collected in a container of a volume of 0.6 m³ which is computed for 10 at. A water seal is used for the regeneration of the coppered silica

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SOV/89-6-3-12/29

An Apparatus for Removing Oxygen and Water Vapor Traces From Inert Gases

gel. The necessary vacuum is produced with a forepump. Before the beginning of work all volumes are evacuated, then filled with inert gas and again evacuated. The containers with the absorbers are then heated to 200 - 250°C (silica gel) and 150 - 200°C (Na+K). Through a number of valves the gas comes first into a stock bin, then into a pressure-reducing valve and finally into the containers filled with the absorbers. The passing amount of gas is measured by means of a rotation flux meter. The purified gas is stored in a gas bottle. The regeneration of the consumed (oxidized) coppered silica gel is carried out by means of hydrogen stored in a steel bottle which passes a pressure-reducing valve and a rotation meter and then enters the steel container 1. Hydrogen consumption is in this case about 40 l per hour. After the first cylindrical container is filled with hydrogen during 10 minutes the heating coil of this device is switched on. At 250 - 300°C an intense reduction of copper oxide starts. The regeneration process must start when approximately 200 m³ gas are purified. It takes approximately 8 hours. For the determination of small amounts of oxygen in the gas the well-known colorimetric method was used (color

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Traces SOV/89-6-3-12/29

An Apparatus for Removing Oxygen and Water Vapor/From Inert Gases

change of a copper solution containing ammonia). About 15 - 20 minutes are necessary for determining the oxygen content. In this case an accuracy of $10^{-3}\%$ can be attained. The different working conditions to obtain maximum efficiency were investigated and the observed dependence of gas purity on the rate of flow of the gas and on the temperature of the absorber is graphically represented. From this it may be seen e.g. that at a consumption of 60 l argon/h the oxygen content is 0.0003 per cent by volume in the purified gas. The purification of nitrogen at the same amount of flow reduces the oxygen content of nitrogen to 0.003 per cent by volume. There are 3 figures and 2 Soviet references.

SUBMITTED: June 21, 1958

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21(9), 24(8)

SOV/39-6-4-2/27

AUTHORS: Kirillov, P. L., Subbotin, V. I., Suvorov, N. Ya.,
~~Troyanov, M. P.~~

TITLE: Heat Transfer in a Tube to a Sodium-Potassium Alloy and to Mercury (Teplootdacha v trube k splavu natriya s kaliyem i k rtuti)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 4, pp 382-390 (USSR)

ABSTRACT: Into a circular tube system made from (Kh18N9T) steel a liquid Na-K-mixture and/or liquid mercury is pumped by means of electromagnetic pumps through a measuring tube (made of brass or nickel, diameter 22-40 mm, wall thickness 4-7 mm, total length 2200 mm, length of heated part of the tube ~1100 mm), and the heat transfer is measured. For this purpose a mobile special thermocouple (a sectional drawing of which is given) is constructed. Further thermocouples of various composition are fitted to the walls of the actual range of measurement. The fact that the thermocouples are composed of different materials and are checked by means of a blank test to a certain extent warrants reproducibility of the measuring results. Moreover, devices for measuring the quantity of heat are connected within the measuring circuit for purposes of

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SOV/89-6-4-2/27

Heat Transfer in a Tube to a Sodium-Potassium Alloy and to Mercury

control. Search thermocouple may be let into the Na-K and Hg current respectively. For the purpose of measuring the electromotive force generated by the thermocouples the potentiometer PPTN-1 is used in conjunction with a mirror galvanometer M-21/4. The NaK circulates through filters and cooling trap, so that the oxygen content in the Na-K-circulation may be reduced down to 0.003 % by weight. On the basis of the experimental data the following conclusions may be drawn: 1) The heat transfer coefficients for Na-K were determined twice, viz.: a) from the wall temperatures of the measuring tube, and b) from the temperature distribution of the flowing Na-K. From both measurements it may be concluded that a contact resistivity to heat exists, which varies with time. The amount of the thermal contact resistivity depends on the oxygen content of the Na-K alloy. It is graphically represented as a function of time (Fig 5). 2) Measurement of the heat transfer coefficients of nickel (measuring tube material) on mercury shows that no thermal contact resistivity exists. Thus, the material of the contact surface influences heat transfer. 3) By using the mobile thermocouple it was possible to find out that the results are not falsified by

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SOV/83-6-4-2/27

Heat Transfer in a Tube to a Sodium-Potassium Alloy and to Mercury

boundary effects and that the length of the heat stabilization for the hydraulically stabilized current is $10 l/d$ (l/d - the specific length of the heated part of the measured distance).

4) For the case mentioned under 2), the data obtained agree well with the data obtained from references 4 and 5. The heat transfer coefficient may be represented by the equation

$Nu = 7 + 0.025 (\varepsilon Pe)^{0.8}$, where $\varepsilon = 1$. There are 9 figures, 1 table, and 10 references, 6 of which are Soviet.

SUBMITTED: June 25, 1958

Card 3/3

KIRILLOV, P.L., kand. tekhn. nauk; TROYANOV, M.F.

Letter to the editor. Teploenergetika 6 no.12:92 D '59.

(MIRA 13:3)

(Alkali metals--Thermal properties)

21 (1)

AUTHORS:

Kirillov, P. I., Kuznetsov, V. A.,
Turchin, N. M., Fedoseyev, Yu. M.

SOV/69-7-1-3/26

TITLE:

Some Designs and the Operation of Pumps for Sodium and Alloys of Sodium With Potassium (Nekotoryye konstruktii i ekspluatatsiya nasosov dlya natriya i spлавov natriya s kaliyem)

PERIODICAL:

Atomnaya energiya, 1959, Vol 7, Nr 1, pp 11 - 17 (USSR)

ABSTRACT:

The following pumps are described: 1. A centrifugal pump which is able to lift the liquid 23 m at 990 rpm and 55 m at 1450 rpm. In the former case, the pump conveys 10 m³/h. The greatest difficulty is caused by the correct selection of the material for ball bearings and sealing the rotating axis towards the exterior. The following material is recommended for the pump, a sectional drawing of which is given: For the hub: steel RF-1 and for the bearing box: beryllium bronze BrB2. The space between hub and bearing box amounted to 0.2 - 0.25 mm in a cold state. All other parts of the pump are made from steel of the type 1Kh18N9T. The pump is driven by an asynchronous electric motor. After 1500 hours of operation with a sodium-potassium alloy at temperatures of 200 - 400°C, the ball bearings were already used up. The greatest disadvantage of these pumps is

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Some Designs and the Operation of Pumps for
Sodium and Alloys of Sodium With Potassium

SOV/89-7-1-3/26

the fact that e.g. the ball bearings are difficult to exchange, and that it is difficult to take off the sealing cylinder. The pump was developed under the supervision of G. V. Skladnev and V. D. Rontovtsev. 2. Centrifugal pump with beryllium bronze ball bearings and an ordinary electromotor. This pump, a sectional drawing of which is given, is distinguished by the fact that the electric motor is completely enclosed and is water-cooled. A noble gas circulates within the pump. Also in this case the question of ball bearings is of decisive importance; after numerous experiments, the materials were selected, which were used for the first-described pump. The pump was tested for 2000 hours with a sodium-potassium alloy, and 7000 hours with sodium alone, at a temperature of 200°C. Besides the ball-bearing problem, a second difficulty arises, viz. the fact that during operation sodium vapors penetrate into the casing of the electric motor, which destroy the insulation of the motor coil- ing by the formation of hydroxide. The pump described was de- veloped under the supervision of M. N. Ivanovskiy. 3. Centri- fugal pump with a ball-bearing made from "frozen" sodium. The pump shown in form of a sectional drawing conveys about 25 m³

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Some Designs and the Operation of Pumps for
Sodium and Alloys of Sodium With Potassium

SOV/89-7-1-3/26

of liquid per hour 100 m high (2960 rpm). The power developed by the electromotor is 14 HP. The finish of the ball bearing, which, at the same time, seals the rotating shaft towards the outside, is shown separately in form of a sectional view. This bearing may be cooled by means of water. The sodium loss amounts to 1 - 2 g/24 hours. The pumps operate 2000 hours at 400 - 500°C, and remain in operation. The construction of these pumps is by V. I. Orlov. 4. Conductive electromagnetic single-phase pump for alternating current. By means of this pump it is possible to convey 4 m^3 of metal per hour, in which case a resistance of 2 kg/cm^2 may be overcome. The brands of wire necessary for the coils are listed separately. This type of pump should be used only if small quantities are to be conveyed. The pump, which is shown by a figure, was constructed under the supervision of N. M. Turchin. 5. Electromagnetic induction pump. This pump consists of two parallel inductors between which there is a channel, through which the liquid metal is able to flow. The indentations of the inductors contain an 8-pole three-phase winding, which may be cooled by means of copper tubes, through

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Some Designs and the Operation of Pumps for
Sodium and Alloys of Sodium With Potassium

307/29-7-1-3/26

which water flows. The width of the channel is 150 mm, and its height in the case of one pump is 6.1 and in the case of the other 8.7 mm. In the interior of the channel copper elements are located at the same height as the ends of the inductors, which are the short-circuit rings for the rotor of the asynchronous motor. The pumps have been in operation for a long time at temperatures of 200 - 250°C (conveying output 30 m³/h). I. A. Tyutin distinguished himself particularly in the course of the construction of this type of pump. There are 7 figures and 7 references, 3 of which are Soviet.

SUBMITTED: February 10, 1959

Card 4/4

83142

S/170/60/003/006/005/011
B013/B067

11.4140

AUTHORS: Grachev, N. S., Kirillov, P. L.

TITLE: Experimental Determination of the Elasticity of Potassium
Vapors at Temperatures of 550 - 1280°C

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 6,
pp. 62 - 65

TEXT: The apparatus schematically shown in Fig. 1 was used to determine the elasticity of potassium vapors between 550 and 1280°C. The vapor pressure was measured by means of a compensating manometer with a sensitivity of 1 mm torr. The results of experimental series with 203 measurements are shown in a diagram (Fig. 2). All experiments were in good agreement within the accuracy of measurement. For comparison, data from Ref. 2 are also plotted. The results obtained by the authors are lower than those of Ref. 2. At 1280°C the divergence is 20%. This divergence could not be explained. The equation $\log P_s = -\frac{4970}{T} - 0.5 \log T + 6.160$

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83142

Experimental Determination of the Elasticity
of Potassium Vapors at Temperatures of
550-1280°C

S/170/60/003/006/005/011
B013/B067

gives an approximation of the measured values of the elasticity of
potassium vapors with an accuracy of up to 2%. P_s - pressure in ata;
T - temperature in °K. There are 2 figures and 3 references: 1 Soviet.

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83330

S/096/60/000/010/004/022

E194/E184

11.4100

AUTHOR: Kirillov, P.L. (Candidate of Technical Sciences)

TITLE: Sodium and Sodium-Potassium Alloys as Heat Transfer Media for Steam Reheat and Technological Processes

PERIODICAL: Teploenergetika, 1960, No 10, pp 40-42

TEXT: In recent years the possibility of using a second heat transfer medium for reheating steam in turbines has often been considered, but has not yet been widely applied mainly because the heat transfer media used cannot operate at temperatures above 450 °C. Mercury vapour has been considered for this purpose but is expensive, of relatively high vapour pressure, does not give a very high heat transfer rate, can be corrosive, and is poisonous. A wide range of heat exchange equipment is used in the petroleum, chemical and other industries and it would be desirable to operate these at high temperatures which would be possible if a heat transfer medium were available that could resist high temperatures, having low vapour pressure and low melting point, high specific heat and low viscosity. The same properties are required as for the reheat of steam. Sodium, and alloys of sodium and potassium may be considered as such heat transfer media, and their physical properties are given in Table 1. Published data covers the range of 0 - 700 °C and the data Card 1/4

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8/096/60/000/010/004/022

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for higher temperatures are obtained by extrapolation. Precautions that would have to be taken if metallic sodium were used are listed. All joints would have to be welded. Reaction between sodium and water would have to be prevented, but that between sodium and steam is not so dangerous. Oxidation of the sodium must also be prevented for two reasons: the oxides are corrosive and they may form solid deposits in the tube. Before filling the system it would have to be heated to a temperature higher than the melting point of sodium which is 97°, which could be done by electric heaters or steam. This would not be required if the eutectic alloys of sodium and potassium were used or another sodium-potassium alloy, for both of which the melting point is below 20 °C. A possible reheat circuit using sodium metal or sodium potassium alloy is illustrated schematically and the main characteristics are given in Table 2. The system is briefly described; various items of secondary equipment are described, including for example measurement of sodium oxide. If sodium or alloy leaked into the furnace it would quickly burn, forming oxides and carbonates most of which would be removed with the flue gases, and the small quantity of oxidation

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products remaining in the furnace would cause no harm. The sodium does not come into contact with water, but is used to reheat steam. The pressure of the steam is much higher than that of the sodium and if any leak occurred it would be of the steam into the sodium which is not excessively dangerous. Various kinds of protective measures that would be required are mentioned. Available operating experience with alkali metals in the USSR and abroad indicates the possibility of constructing reliable equipment for reheat in power stations. The use of electromagnetic pumps for metallic sodium is recommended. If sodium or its alloys are used as heat transfer media the costs are very much smaller than when mercury is used. A number of the advantages claimed are mentioned. It appears that ordinary ferrite steels can be successfully used in contact with sodium at temperatures up to 450-500 °C and austenitic steel at temperatures up to 800 °C, provided that the oxygen content does not exceed 0.005% by weight. It is concluded that sodium and sodium potassium alloys deserve a thorough study as high temperature

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heat transfer media. In the first place, operating experience should be obtained with small-scale installations of 500-1000 kW. Detailed technical information could be secured by applying the recommended method of reheat at a new or existing power station. K

There are 1 figure, 2 tables and 9 references: 5 Soviet and 4 English.

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21.1320

77210
SOV/89-8-1-4/29

AUTHORS: Kirillov, P. L., Kozlov, F. A., Subbotin, V. I.,
Turchin, N. M.

TITLE: Purification of Sodium From Oxides and Methods of
Control of Oxide Content

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 1, pp 30-36 (USSR)

ABSTRACT: Oxides in sodium used in liquid heat exchangers in
reactors produce corrosion and tend to produce deposits
in cooler parts of the contours which can cause clog-
ging. The authors investigated, therefore, cold traps
for oxides and a plug indicator for oxides. They
wanted to avoid chemical methods which, besides being
complicated and time-consuming, become extremely
complex in the case of radioactive sodium. The setup
on Fig. 2 utilizes the well-known relation between
the solubility of oxygen in sodium and its temperature:

$$W = 2,7 \cdot 10^{-4} \left(\frac{t}{100} \right)^{3,6} \quad (1)$$

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Purification of Sodium From Oxides
and Methods of Control of Oxide
Content

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567/89-8-1-4/29

where W is solubility of oxygen (% weight); t is temperature ($^{\circ}\text{C}$). It makes possible determination of oxide content. As soon as the temperature drops below the temperature of saturation for oxides in sodium, precipitation takes place, clogging the slots on the main valve, and the flow of sodium decreases as shown in Fig. 3. The authors varied oxygen concentration from 0.002 to 0.1% weight, the temperature from 110 to 550°C , and the size of slots from $0.5 \times 0.5 \text{ mm}$ to $1 \times 1 \text{ mm}$. The number of slots should be 10 to 15 to reduce effects of accidental clogging. The readings were independent of the cooling rate of sodium while the oxygen concentration varied between 0.008 and 0.02% weight, the metal velocity between 2.5 and 13 m/sec, and the rate of decrease of the valve temperature between 0.3 and 37°C/min . Table 3 shows comparative data from the method described here and the chemical analysis. The authors investigated the cold trap shown in Fig. 5. On this figure, 1

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Purification of Sodium From Oxides
and Methods of Control of Oxide
Content

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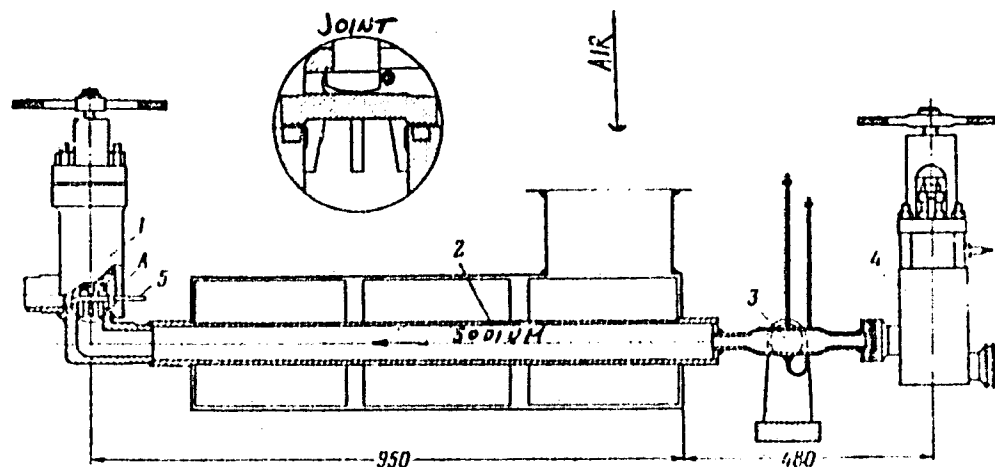


Fig. 2. Construction of plug indicator of oxides: (1) basic valve with radial slots in the disk stopping the oxide; (2) sodium-air heat exchange; (3) flow meter; (4) throttle valve; (5) thermocouple for temperature measurements at the clogging spot.

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Purification of Sodium From Oxides
and Methods of Control of Oxide
Content

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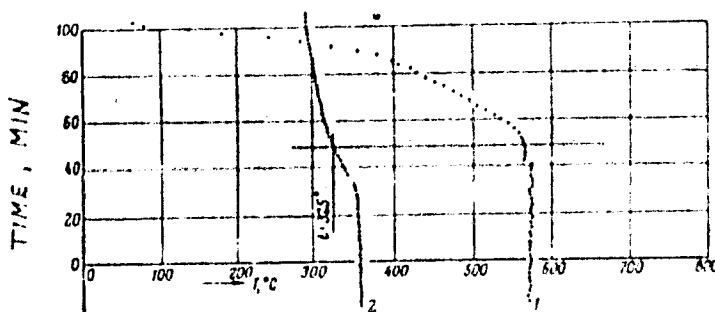


Fig. 3. Examples of registered curves of flow and temperature of sodium on the iterative (secondary) oxide indicator. (1) Emf of magnetic flow meter; (2) temperature of the flap of the basic valve.

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Purification of Sodium From Oxides
and Methods of Control of Oxide
Content

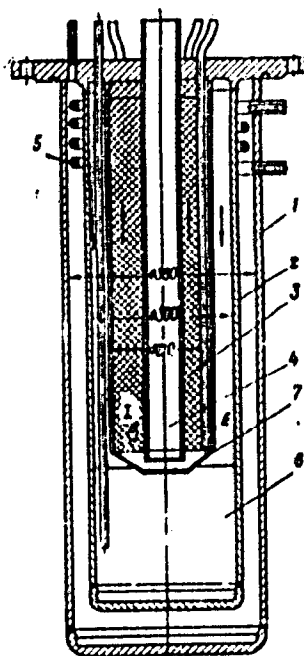
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Table 3. Oxide content in the trap determined by
the two methods, in g.

Number of the trap	Data from the indicator of oxides	Data from the gas analysis
1	890±100	1,000±500
10	4,750±700	6,200±900

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Fig. 5. Construction of cold trap. Capacity, 32 l of sodium.

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represents a jacket containing toluol as cooling agent. Toluol evaporates and then condenses on the water-cooled tubing 5. 2 is the main cylindrical container, with an inner cavity filled with chips or wires from stainless steel. This setup is safe against possible escape of sodium. 6 is a settling tank for oxides, and the cone 7 slows down the flow of metal through the settler. A nichrome heater at 4 provides preliminary heating. The reduction of oxygen concentration in sodium can be computed from the equation of matter balance:

$$\gamma V dc = \gamma Q (c - c') dt, \quad (2)$$

where V is volume of sodium in the contour in m³; c is concentration of oxygen in sodium in % weight; c', solubility of oxygen in the metal at temperature t' in

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% weight (t' is lowest temperature of the metal in the trap); Q flow of metal through the trap in m^3/h ; γ , specific gravity of the metal at the temperature of the contour, in kg/m^3 ; τ , operating time of the trap in hours. After discussing the conditions of validity of Eq. (2), the authors perform the integration and obtained:

$$c = c' + (c_0 - c')e^{-n} \quad (3)$$

where c_0 is original concentration of oxygen in sodium; n is number of times the whole amount of sodium passed through the trap during time τ ; $n = \frac{Q\tau}{V}$. This equation was used as a check on experimental results since a removal of oxides from the trap raised the experimental points above the calculated ones. The authors give detailed data about experimental results

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with two traps of different sizes. They concluded that the cold trap can reduce the content of oxygen in sodium down to 0.002% weight, that any required reduction is possible by proper adjustment of operating conditions, that the efficiency of the trap increases after some oxides are already deposited; that chips in the trap work better than wire of 0.5 mm diameter, and that the capacity of the trap increases with the flow velocity. The authors measured also the variation of the concentration of oxygen as a function of n (the experimental points follow quite well the theoretical curve from Eq. (3)) and the longitudinal temperature distribution inside the trap. There are 4 tables; 7 figures; and 15 references, 8 Soviet, 2 U.K., 5 U.S. The 5 most recent U.K. and U.S. references are: A. McIntosh, K. Bagley, J. Brit. Nucl. Energy Conference, 3, Nr 1, 15 (1958); J. White, Nucl. Sci. Abstr., 15, 8290 (1957); O. Salmon, T. Cashman, J. Inst. Metals,

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Purification of Sodium From Oxides
and Methods of Control of Oxide
Content

77210
SOV/89-8-1-4/29

84, 7 (1956); J. Grey, R. Neal, B. Voorhess, Nucleonics,
14, Nr 10, 34 (1956); W. Bruggemann, J. Amer. Inst.
Chem. Engr, 2, 153 (1956).

SUBMITTED: April 20, 1959

Card 10/10

82953

S/089/60/009/003/001/014

B006/B063

21. 1200

26. 2200

AUTHORS: Kirillov, P. L., Kolesnikov, V. D., Kuznetsov, V. A.,
Turchin, N. M.

TITLE: Instruments for Measuring Pressure, Flow, and Level of Molten
Alkaline Metals

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 3, pp. 173 - 181

TEXT: The present article deals with problems of construction, design, and application of instruments for measuring pressure, flow, and level of molten alkaline metals. The instruments described here are designed for reactors with liquid-metal coolants. First of all, the authors describe pressure gauges. The simplest method is a connection to a separation tower which is filled with a noble gas (Fig. 1). This method has, however, several disadvantages. The zavod "Manometr" ("Manometr" Factory) developed an inductive pressure transmitter of the diaphragm-type MMC-4 (MMS-4), whose cross-sectional view is schematically shown in Fig. 2. The diaphragm is made of special steel. The range of application of these instruments extends to 10 atm and 450°C (sodium). The two-bellows sealed pressure

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Instruments for Measuring Pressure, Flow, and
Level of Molten Alkaline Metals

S/089/60/009/003/001/014
B006/B063

gauge, made of 1X18H9T (1Kh18N9T) steel, which is shown in Fig. 3, is a simple and dependable instrument. The indication of this pressure gauge is linearly dependent on the ratio of the hardness of the bellows to their cross-sectional area. Fig. 4 gives the calibration of this pressure gauge as a function of A/F . For $A/F = 1.25 \text{ kg/cm}^3$, e.g., the calibration scale is shifted by 2.5%. Fig. 5 shows the calibration straight lines of such pressure gauges for bellows of different hardness A ($A/F = 10.7, 3.6$, and 1.25 kg/cm^3). Formulas are given for the two components of the temperature error. Choke flow-meters with inductive differential diaphragm pressure gauges proved to be unsuitable for flow measurements on sodium. Magnetic flow-meters in which an electromotive force is measured are the simplest and most reliable. Fig. 6 reproduces a photograph of such an instrument designed for DP-5 (BR-5) reactors cooled with liquid sodium. The stability of this instrument largely depends on the material used for the magnet, which must retain its properties at high temperatures for a long time of operation. For this purpose, the authors used the alloy "Magnico", the induction of which as a function of temperature is shown in Fig. 7. Examination of the stability of three flow-meters of this type for one year

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Instruments for Measuring Pressure, Flow, and
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(mean sodium temperature: 400°C) showed that the induction in the pole gaps had decreased by 1% after one month; in the following months, it decreased by 0.5% and less. The results of measurement of the emf between the electrodes are given in tabular form. Fig. 8 schematically shows how the electrodes were welded to the tube. The indication of the flow-meter is slightly influenced by the contact resistance on the inner surface of the tube (cf. Fig. 9). Fig. 10 shows calibration curves at 10 and

200 m^3/hour of flow-meters on a BR-5 reactor. These curves are in good agreement with the theoretical characteristics. In the course of time, iron and nickel particles settle inside the tube at the places of the poles. Fig. 12 reproduces a photograph of the inside of such a tube after 1000 hours of operation (tube diameter: 27 mm). The deposits on the two sides have grown together in the center, and reduce the cross-sectional area of the tube considerably. The error in indication of the flow-meter is 12.5% in this case. Of the various level-meters, the authors first discuss those which are not well suited or even unsuited for reactor operation as, e.g., the YP-4 (UR-4) level-meter which operates without contact and by means of Co^{60} γ -emission, but is unsuited for measurements

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Instruments for Measuring Pressure, Flow, and
Level of Molten Alkaline Metals

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on radioactive liquid metals. Furthermore, the authors describe the ultra-short wave level-meter and a potentiometer level-meter suggested by V. D. Kolesnikov. This instrument is schematically represented in Fig. 13. Its construction, especially that of the transmitter (Fig. 14), is described in detail. It has a linear scale, and was tested on a eutectic Na-K alloy at 200°, 300°, and 450°C. There are 14 figures, 1 table, and 4 references: 3 Soviet and 1 US. ✓

SUBMITTED: March 22, 1960

Card 4/4

11.4100

31882
S/170/62/005/001/011/013
B125/B104

AUTHORS: Abramova, V. M., Kirillov, P. L.

TITLE: Critical parameters of alkali metals

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, v. 5, no. 1, 1962, 108 - 110

TEXT: The critical parameters $p_{crit} = \frac{1}{27} \frac{a}{b^2}$ (3), $T_{crit} = \frac{8}{27} \frac{a}{bR}$ (4),

$V_{crit} = 3b$ (5) are obtained from van der Waals' equation with
 $(\partial p / \partial V)_{T_{crit}} = 0$ and $(\partial^2 p / \partial V^2)_{T_{crit}} = 0$ (2). These relations are also valid

for temperature-dependent a and b . Most of the conventional methods for calculating critical parameters were purely empirical. The requirement that a and b should be dependent on the parameters, though theoretically forbidden, nevertheless provides useful results. If only b depends on V (Von Lahr, Zeitschrift für allgemeine Chemie, 146, 263, 1925), the

critical parameters are given by $T_{crit} = \frac{8\lambda}{27} \frac{a_{crit}}{b_{crit}} \frac{1}{R}$ (6), $p_{crit} = \frac{\lambda}{27} \frac{a_{crit}}{b_{crit}^2}$

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X

Critical parameters of alkali metals

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S/170/62/005/001/011/013
B125/B104

$$= \frac{RT_{crit}}{8} \frac{1}{b_{crit}} (7), \text{ and } V_{crit} = gb_{crit} (8) \text{ with } g \approx 2.0 - 2.1 \text{ and } a\lambda = 27/21.$$

In spite of the approximate calculation of b_{crit} , the errors involved in the determination of the critical pressure are small. A comparison of critical temperatures and pressures calculated in different ways indicates that the application of van der Waals' equation provides the most exact results. There are 2 tables and 15 references: 5 Soviet and 10 non-Soviet. The four most recent references to English-language publications read as follows: Evas W. H. et al., Journal of Research of the National Bureau of Stand., 52, 2, 83, 1955; Liquid Metals Handbook, ed. R. Lyon, 1955; Andradeda E. N., Dobbs E. K. Proc. Phys. Soc., A 211, 1104, 1952; Meissner H. P., Redding E. M., Industrial and Engineering Chemistry, 34, 121, 1942.

SUBMITTED: July 21, 1961

Card 2/2

X

SUBBOTIN, V.I.; PAPOVYANTS, A.K.; KIRILLOV, P.L.; IVANOVSKIY, N.N.

Heat transfer to liquid sodium in pipes. Atom. energ. 13 no.4:380-
382 0 '62. (MIRA 15:9)

(Heat—Transmission) (Sodium)

KIRILLOV, P.L.

Generalization of experimental data on heat transfer in liquid
metals. Atom. energ. 13 no.5:481-484, N '62. (MIRA 15:11)
(Heat--Transmission)
(Liquid metals)

ACCESSION NR: AP4000404

S/0294/63/001/001/0102/0106

AUTHOR: Kirillov, P. L.

TITLE: Limiting values for the heat transfer coefficient

SOURCE: Teplofizika vy*sokikh temperatur, v. 1, no. 1, 1963, 102-106

TOPIC TAGS: heat transfer, liquid metal, heat transfer coefficient, sodium, potassium, lead, bismuth, metal alloy, heat exchange

ABSTRACT: Although the heat exchange coefficient for stationary conditions at constant heat load leads to an integral which cannot be evaluated completely, the problem can be solved for a liquid with vanishing Prandtl number. However, the results for turbulent flow obtained by different workers deviated from one another because of differences in the assumptions made. The author obtains

$$T^* = \frac{Pe}{4} (1 - \xi^2) = \frac{Pe}{4} \sqrt{\frac{\xi}{8}} (1 - \xi^2).$$

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ACCESSION NR: AP4000404

where T^* -- dimensionless temperature, ζ -- coefficient of hydraulic resistance, and ξ -- dimensionless radius, and Pe -- Peclet number. This equation agrees with many experimental values for liquid metals. It is shown that this equation makes it possible to monitor the correctness of experimental data by measuring the temperature profile in a stream of liquid metal. Orig. art. has: 2 figures, 12 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED: 08May63

DATE ACQ: 13Dec63

ENCL: 00

SUB CODE: AS, NS

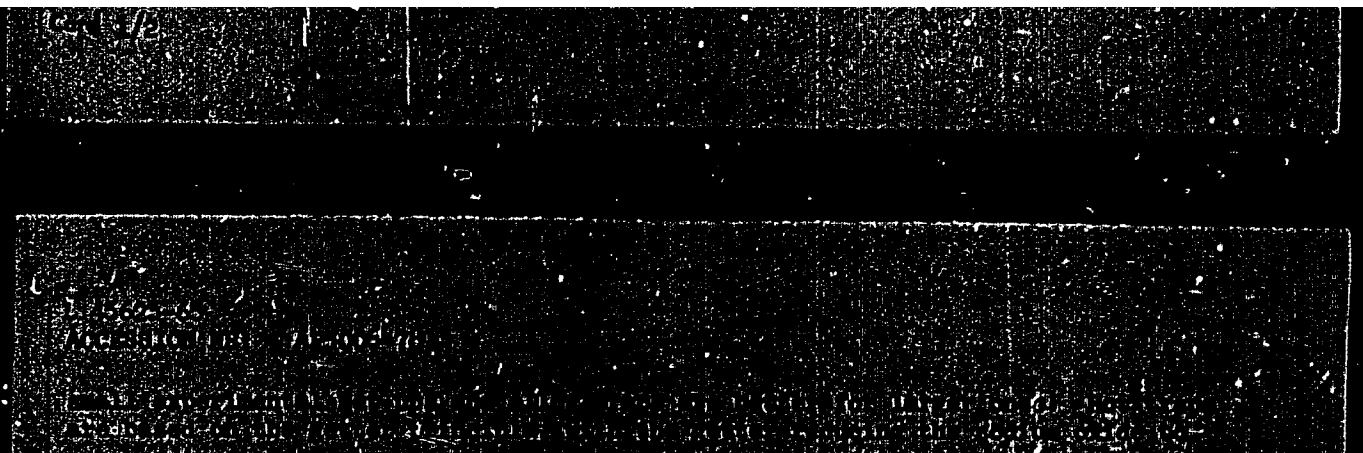
NO REF SOV: 008

OTHER: 005

Card 2/2

"APPROVED FOR RELEASE: 09/17/2001

CIA-RDP86-00513R000722630002-9



APPROVED FOR RELEASE: 09/17/2001

CIA-RDP86-00513R000722630002-9"

L 1927-66

EPA(s)-2/ENT(m)/EPF(c)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)

MJM/JD/

ACCESSION NR: AP5023777

NW/JG/WB/DM

UR/0089/65/019/003/0298/0300
621.039.534.6

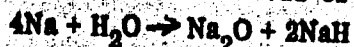
AUTHOR: Subbotin, V. I.; Kirillov, P. L.; Koslov, V. A.; Ivanovskiy, N. M.;
Makarov, V. M.

TITLE: Removal of the products of interaction with water from sodium in a circulation loop

SOURCE: Atomnaya energiya, v. 19, no. 3, 1965, 298-300

TOPIC TAGS: sodium, sodium compound, nuclear power plant, liquid metal cooled reactor

ABSTRACT: In high-capacity nuclear power plants, the use of a "sodium-water steam generator with a single heat-transfer wall is very promising. However, a substantial amount of water may reach the sodium loop, and an important problem is the removal of products formed by the reaction with water from the sodium. The present study is made in a standard sodium circulation loop. The removal of sodium hydride is investigated by introducing hydrogen and using a cold trap to filter the sodium. Experiments on removal of products of the reaction with water



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ACCESSION NR: AP5023777

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were similar. The data show that the purification of sodium involving removal of hydrogen, Na_2O and 2NaH by means of the cold trap and the monitoring of the content of these substances are fully satisfactory. No signs of corrosion are observed on 1Kh18N9T steel at 400C after a 2000-hr. contact with the sodium-water reaction products. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 01Mar65

ENCL: 00

SUB CODE: NP, GC

NO REF SOV: 003

OTHER: 001

mlr
2/2

KIRILOV, P.

1708

USSR/Bombs 2302.0403

Sep 1947

"High Explosive and Splinter Bombs," P. Kirilov,
2 pp

"Za Oboronu" Vol XXIII, No 11

Reference to number of bombers constructed prior to World War II by foreign countries. Reports 120,000 airplanes constructed in USSR during last three years of war. Discusses properties of two types of bombs and effects of their explosions as witnessed during war.

IC

1708

KIRILLOV, P.

1805

USSR/Civil Air Defense 2107.

Oct 1947

"Protection against the Action of High-Explosive and Fragmentation Bombs," P. Kirillov, 2 pp

"Za Oboronu" Vol XXIII, No 12

Designed to aid instructors of FVKhO (Antiaircraft and Chemical Defense). Mentions that greatest difficulty in recent war not in method of protection, but in necessity of organizing defense measures on large scale for millions of people. Describes air-raid shelters and chemical defense, ditches, trenches and other types of field covering, protection of industrial buildings and equipment, and protection against duds.

10

1805

KIRILLOV, P. M.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 572 - I

BOOK

Call No.: AF488930

Author: KIRILLOV, P. M.

Full Title: ~~TO THE MEMBER-OF~~ THE ALL-UNION VOLUNTARY SOCIETY FOR THE
PROMOTION OF THE ARMY, AIR FORCE AND THE NAVY ABOUT LOCAL
ANTIAIRCRAFT DEFENSE

Transliterated Title: Dosaafovtsu o MPVO

PUBLISHING DATA

Originating Agency: None

Publishing House: Publishing House of the DOSAAF (All-Union Voluntary
Society for the Promotion of the Army, Air Force and the Navy)

Date: 1952

No. pp.: 63

No. of copies: Not given

Editorial Staff

Editor-in-Chief: Tramm, B. F.

PURPOSE: A textbook for members of FVKhO, Antiaircraft and Chemical
Warfare Defense

TEXT DATA

Coverage: This is an elementary booklet on antiaircraft and chemical
defense. It is subdivided into the following chapters: 1. means
of attacking the rear and antiaircraft defense; 2. defense against
high explosive and fragmentation air bombs; 3. defense against in-

Dosaafovtsu o MPVO

AID 572 - I

condiary air bombs; 4. defense against chemical warfare; 5. rules
for the behavior of the population during air raids.
No. of References: None
Facilities: None

2/2

KIRILLOV, P.

~~Means of air attack and air defense.~~ Kryn.rod. 3 no.9:21-23 S '52.
(Air warfare) (MIRA 8:8)

KIRILOV, P.M.; KUROCHKIN, P., redaktor; GOLOVCHENKO, G., tekhnichniy redaktor.

[What one should know about local antiaircraft defense; for members of the All-Union Volunteer Society for Cooperation with the Army, Air Force and Navy; lesson manual for Antiaircraft and Chemical Warfare Defense units of the Society (for group study) Translated from the Russian] Shcho treba znaty pro mistsevu proty-povitriannu oboronu; DOTSAAFivtsevi pro MPFO. Posibnyk dlia zaniat' u hurtkakh PPKhO DOTSAAF. Pereklad z rosiis'koi. Kyiv, Derzh.vyd-vo tekhn. lit-ry URSR, 1953. 71 p. (MIRA 8:2)

(Air defenses)

SAVITSKIY, I.I.; KIRILLOV, P.M.; KUROCHKIN, F., redaktor; GOLOVCHENKO,
H., tekhnicheskii redaktor.

[Antiaircraft defense; manual for instructors in antiaircraft
defense in the All-Union Volunteer Society for Cooperation
with the Army, Air Force, and Navy. Translated from the Russian]
Protypovitrana oborona; posibnyk dlia instruktoriv PPO DTSAAP.
Pereklad z rosiis'skol. Kyiv, Derzh.vyd-vo tekhn. lit-ry, 1953.
215 p. [Microfilm] (MIRA 8:2)
(Air defenses)

~~KIRILLOV~~, Pavel Mikhaylovich; MOSKALEV, V.D., redaktor; KANEVSKAYA, M.D.
redaktor; ANDRIANOV, B.I., tekhnicheskii redaktor

[Information for members of the All-Union Volunteer Society
for Assistance to the Army, Air Force, and Navy about local
anti-aircraft defense] Dosaafovtsu o MPVO. Pod obshchei red.
V.D. Moskalova. Moskva, Izd-vo DOSAAF, 1956. 110 p. (MLRA 10:5)
(Air defenses)

MAL'SHINSKIY, A.; KIRILLOV, P.; ARKHIPOV, M.

Without knowledge of the subject ("Local air defense."
V. Sinitsyn and others. Reviewed by A. Mal'shinskii and others).
Voen.znan. 31 no.6:31 Je '56. (MLRA 9:10)

(Civil defense) (Sinitsyn, V.)

KIRILLOV, P.N., polkovnik meditsinskoy sluzhby

Role of a post physician in organizing and conduction special
training for medical personnel. Voen.-med.shur. no.7:15-19
Jl '59. (MIRA 12:11)
(MILITARY MEDICINE educ)

TROFIMOV, A. [reviewer]; KIRILLOV, S. [author].

Results of the work of the ship committee ("Competition on the
fishing trawler 'Lenin.'" S.Kirillov. Reviewed by A.Trofimov).
Sov. profsoiuzy 1 no.1:83-88 S '53. (MLRA 6:12)
(Kirillov, S.) (Fisheries)

KIRILLOV, S.; RUDAKOV, A.

What hampers the manufacturing of good clothes. Sov. torg. 35
no.3:7-8 Mr '62. (MIRA 15:3)

(Clothing industry)

KIRILLOV, S., ofitser Voenno-Morskogo Flota v otstavke

In search of the Northeast Passage. Mor.flot 22 no.12:4-5 D '62.
(MIRA 15:12)

(Northeast Passage)

KIRILLOV, S.

How to finish furniture. Stroitel' 9 no.2:29-31 F '63.

(MIRA 16:2)

(Furniture)

KURSHAKOV, M.A.; KIRILJOV, S.A.; SELIDOVKINA, A.A. (Moskva)

Cardiac contractions in hypertensive and rheumatic patients.
Kardiologija no.3:12-18 '65. (MIRA 18:10)

1. Chlen-korrespondent AEN SSSR (for Kurshakov).

KIRILLOV, S.A., kand.med.nauk; ZHUZHKOVA, I.F. (Moskva)

Rare case of the cardiovascular form of rheumatic fever. Klin.med.
37 no.10:120-123 O '59. (MIRA 13:2)

1. Iz 6-y klinicheskoy bol'nitsy Mosgorsdravotdela (glavnyy vrach
I.N. Kurgannikov).
(RHEUMATIC HEART DISEASE pathol.)

Kirillov, S.I.

AID P - 2060

Subject : USSR/Electricity

Card 1/2 Pub. 26 - 2/29

Authors : Kaganovich, S. A., Kand. of Tech. Sci., Chalenko, O. N.,
Eng., Popov, A. G., Eng., and Kirillov, S. I., Eng.

Title : Increasing economy in milling Moscow basin coals

Periodical: Elek. sta., ²⁶4, 6-11, Ap 1955

Abstract : The article describes the operation of ball mills for
culm at one of the Moscow Regional Electric Power Plants
and recommends some improvements to save pulverized coal
in the milling process. A description of the Soviet-made
ball mill with pertinent data is included. The separator
was designed by the VTI (All-Union Technical Institute),
and has a well-organized venting of returned pulverized
culm. Its efficiency and capacity are presented. Various
tests of venting returned pulverized coal with different
loads in the ball mill are described, and the consumption
of power needed and detailed data on the returned pulverized

BUDANOV, V.I.; MESKHI, A.M.; VOLKOV, V.N.; KIRILLOV, S.P.

Epochs of granitoid magmatism in the Pamirs and the Darvaza Range.
Dokl. AN SSSR 136 no. 3:684-682 Ja '61. (MIRA 14:1)
(Pamirs—Granite) (Darvaza Range—Granite)
(Geology, Structural)

КЕРИЛАН, . . .

volcanic formations of the Vanch-Darvaza tectonic subzone of the
Central Pamirs. Zap. Tadzh. otd. Vnes. min. ob-va no.2:27-39 '64.
(MIRA 18:9)
--. Upravleniye geologii i okhrany nedr pri Sovete Ministrov Tadzhik-
skoy SSR.

POLISHCHUK, Z.K.; KIRILLOV, S.P.; DROZDOV, V.M.

Concerning B.P. Barkhatov's note "Hasty conclusions on lower
palozoic stratigraphy of the Pamirs." Izv. Otd. geol.-khim.
1 tekhn. nauk AN Tadzh. SSR no.1:129-132 '59. (MIR' 14:8)
(Pamirs--Geology, Stratigraphic) (Barkhatov, B.P.)

HUDANOV, V.I.; KIRILLOV, S.P.; STAZHILO-ALEKSEYEV, K.F.; STUPNIKOV, A.R.

Configuration of granitoid intrusives of the northern Pamirs
(Lake Kara-Kul basin). Dokl. AN Tadsh. SSR 3 no.3:9-14 '60.
(MIRA 16:2)

1. Upravleniye geologii i okhrany neдр pri Sovete Ministrov
Tadzhikskoy SSR. Predstavleno chlenom-korrespondentom AN Tadzhik-
skoy SSR R.B. Baratovym.

(Kara-Kul Lake region (Pamirs)—Granite)

L 08573-67

ACC NR: AR6032082

SOURCE CODE: UR/0271/66/000/007/B020/B020

AUTHOR: Grachev, A. G. ; Kirillov, S. S. 45

TITLE: Eight-channel semiconductor scaling device with printed output

SOURCE: Ref. zh. Avtomatika, telemekhanika i vychisl'naya tekhnika, Abs. 7B146

REF SOURCE: Sb. Poluprovodnik, elementy v vychisl. tekhn. M., 1965, 3-17

TOPIC TAGS: semiconductor device, power supply, scaling device, scaling channel, control generator, control circuit, scaling decade

ABSTRACT: Description is given of a semiconductor scaling device developed at the Joint Institute of Nuclear Research which makes automatic printing of output data possible. The device consists of eight scaling channels, an input-output control circuit with an intermediate memory, a type TsPM-1 digit printing machine (part of the ChZ-4 frequency meter set), and a control generator. Each scaling channel consists of an input pulse shaping unit, six unified scaling decades, an output unit, and a power source. A block-diagram of the device and schematic

Card 1/2

UDC: 681.142:621.374.32

L 98573-67

ACC NR: AR6032062

diagrams of the input unit, decade, decoder, control circuit elements, control generator intermediate memory, and power supply unit, are given. Orig. art. has: 13 illustrations and a bibliography of 2 titles. [Translation of abstract]

SUB CODE: 09/

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Card - 2/2

KIRILLOV, S.S.

There should be a drastic improvement in the work of fashion houses.
Leg.prom. 15 no.5:8-10 My '55. (MLRA 8:7)

1. Zamestitel' nachal'nika Glavshveytrikotazha Ministerstva
promyshlennykh tovarov shirokogo potrebleniya SSSR.
(Clothing industry)

KIRILLOV, S.S.

KIRILLOV, S.S.

What kind of fabrics does the clothing industry need. Tekst.prom.
17 no.10:61-62 0 '57. (MIRA 10:12)
(Textile fabrics) (Clothing industry)

KIRILLOV, S.S. (Moskva)

Design and construction of clothing in the Houses of Costume
Design of the Russian Federation. Shvein. prom. no.1:19-22
Ja-F '63. (MIRA 16:4)

(Costume design)

KIRILLOV, S.S.

Clothing for boys. Shvein. prom. no.3:4-7 My-Je '65.
(MIRA 18:9)

1. Glavnyy tovaroved kontory "Roostergodezhda", Moskva.

KIRILLOV, S.S. (Moskva)

Results of the Russian Fair. Shvein. prom. no. 61-3 N-D '64
(MIRA 18:2)

1. Zamestitel' nachal'nika Respublikanskoy kontory optovoy
torgovli odezhdoy Ministerstva trgovli RSFSR.